

09/608/30

ABSTRACT OF THE INVENTION

A moving magnet actuator for providing haptic feedback. The actuator includes a grounded core member, a coil is wrapped around a central projection of the core member, and a magnet head positioned so as to provide a gap between the core member and the magnet head. The magnet head is moved in a degree of freedom based on an electromagnetic force caused by a current flowed through the coil. An elastic material, such as foam, is positioned in the gap between the magnet head and the core member, where the elastic material is compressed and sheared when the magnet head moves and substantially prevents movement of the magnet head past a range limit that is based on the compressibility and shear factor of the material. Flexible members can also be provided between the magnet head and the ground member, where the flexible members flex to allow the magnet head to move, provide a centering spring force to the magnet head, and limit the motion of the magnet head.